THE PREVALENCE OF RHEUMATIC HEART DISEASE IN A RURAL POPULATION CATERED BY RURAL HEALTH CUM TRAINING CENTRE, MANDUR AND ADMINISTRATION OF SECONDARY PROPHYLAXIS

DISSERTATION SUBMITTED FOR THE

DPH

(DIPLOMA IN PUBLIC HEALTH)

EXAMINATION

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INTRODUCTION

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Rheumatic fever, a clinical syndrome, is an acute inflammatory disease, the chief manifestations of which are arthritis, carditis, subcutaneous nodules, erythema marginatum and chorea. Although it is not a communicable disease it results from a communicable disease i.e. streptococcal pharyngitis. The importance of this disease centres around the fact that it produces heart disease which can be fatal during the acute stage or can lead to crippling chronic heart disease. "Rheumatic fever licks the joints and bites the heart".

The most striking observation regarding rheumatic fever in the last few decades has been the decrease in its incidence in the developed countries and its persistence in the developing countries. Rheumatic fever and rheumatic heart disease were widespread in Europe at the turn of the century, then began to decline. The best information came from Denmark, where rheumatic fever has been notifiable since 1878. Between 1862 and 1900, the annual incidence of rheumatic fever was over 200 per lakh population, but by 1948 it had fallen to about 55 per lakh. The decline subsequently accelerated and by 1962, the incidence was just over 10 per lakh population. Today the mean annual incidence of rheumatic fever in the affluent countries is less than 5 per lakh and is still falling (TRS No. 764).

By the late 1940s, it was evident that rheumatic fever was a significant problem in tropical countries, annual incidence rates ranging from 27 to 100 per 1,00,000 have been recorded in some Eastern Mediterranean Countries (H.A. Majeed et al; unpublished data). Similar rates have been reported from countries in the Western Pacific; for example the annual incidence in Maoris under 20 years of age in Northland, New Zealand is 116/1,00,000. Among socially and economically disadvantaged populations with overcrowded living conditions in developing countries, the incidence is likely to approach 100/1,00,000 in children. The prevalence of rheumatic heart disease among school children in the affluent countries has been reported as 0.6/1000 in U.S.A. and 0.7/1000 in Japan. The decrease in rheumatic fever in these countries started long before sulfonamide and penicillin were used. This decrease has been attributed to improved socio-economic conditions and general living standards. Rheumatic fever/rheumatic heart disease is the most important cause of cardiac death below the age of 45 years in Mongolia, the Phillipines, Indonesia, the Pacific islands, India, Burma, Sri Lanka, Pakistan and the Middle East. The available information suggests that incidence rates of rheumatic fever approaching 100/1 lakh in younger age groups are to be expected in most developing countries. However, even in societies with a high average income, there remain islands of

poverty where a relatively high incidence of rheumatic fever may persist, rendering the 'eradication of rheumatic fever an unfulfilled hope'. (Markowitz 1970).

Historical data: Yearly 30-40% of the patients seen in cardiac clinics in major hospitals are cases of rheumatic fever/ rheumatic heart disease (Padmavati 1985). The British military physician in India before the World War II mostly remarked on the rarity of rheumatic heart disease and rheumatic fever in the wards and at autopsies although differences of opinion existed. In 1938, however, Stott the first person to study the problem of rheumatic heart disease in India seriously observed that the extent of the problem was identical in India and London. From 1935 to 1949 reports in Indian Journal pointed to the high prevalance of rheumatic heart disease in all states of the Union. It is possible that urban migration around this period with the creation of slums, overcrowding and cross-infection contributed to this situation.

The link between Group A B-haemolytic streptococcal upper respiratory infection and the subsequent development of rheumatic fever is well established. The disease is typically associated with poverty and especially with poor housing and overcrowding, which favour the spread of streptococcal upper respiratory infection.

Earlier rheumatic fever was considered to be the disease of temperate climates, however a number of reports have shown that it is present rather in high frequency in tropical countries (WHO chronicle 1980). As Shaper (1972) summarises the problem 'tropical in this context pertains less to climate per se than the ecology of rheumatic fever including poverty, overcrowding and grossly inadequate health services.

The only way to achieve a real breakthrough is to combat the root cause of the disease in the population, a matter for public health action.

Although attacks of rheumatic fever can be treated even the best treatment has no effect on the subsequent development and course of rheumatic heart disease. The prevention of rheumatic fever is the only solution. The evidence is very strong that adequate treatment of streptococcal throat infection does prevent the occurence of rheumatic fever. Widespread improvements in socio-economic conditions will eventually help to diminish poverty related disease i.e. rheumatic fever/rheumatic heart disease, but few developing countries can expect the incidence to decline significantly for this reason.

Goa and its surrounding areas on the West Coast of India have a tropical climate and a certain degree of socio-economic

development. In 1980 Souza et al, studying 14,592 children of school-going age found the prevalence of rheumatic heart disease in Goa to be 1.3/1000.

With much research done on rheumatic fever and its relationship to rheumatic heart disease, it still remains as serious a public health problem. In this country, it is important to unravel the social factors and differences in the health outcome responsible for rheumatic fever and rheumatic heart disease in various social settings. Since socio-economic factors and overcrowding play an important role and are widely responsible for the magnitude of the problem, this study was thought to be essential to add to the current knowledge of the socio-economic factors in rheumatic fever/rheumatic heart disease in a rural area and compare with other Indian states.

The present study is conducted with the aim of studying the prevalence of rheumatic fever and rheumatic heart disease in the area catered to by the Rural Health cum Training Centre, Mandur, and its five sub-centres and administer secondary prophylaxis. This will help in implementing an effective prevention programme in the near future.

AIMS & OBJECTIVES

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2.1 To study the prevalence of rheumatic fever and rheumatic heart disease in a rural population.

2.2 To administer secondary penicillin prophylaxis.

2.3 To study the social factors associated with rheumatic heart disease.

2.4 To suggest preventive and control measures to the population so that rheumatic fever/rheumatic heart disease will cease to be a public health problem.

REVIEW OF LITERATURE

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3.1 History

Though acute rheumatic fever was apparently known to the ancient Greeks, it was many centuries before it became clearly separated from other forms of rheumatism. Sydenham whose name is associated with chorea, also described the pattern of the migratory arthritis, but the association of the two manifestations were first recognised by Stoll a century later in 1780. Shortly thereafter, Pitcain, Jenner and Wells emphasized that rheumatic fever can damage the heart.

Another century passed before the French paediatrician, Roger recognised the relation of the various manifestations of the disease and cheadle in 1889 printed out the variations in the clinical patterns at different ages as well as the tendency of the disease to occur in families. Although earlier observers had described submiliary nodular reactions in the myocarduim, Aschoff in 1904 is generally credited with stressing their specificity. The criteria introduced by Jones in 1944 brought order into the clinical classification.

The association of acute rheumatic fever with sorethroat and the concept of a latent period were recognised during the 19th century, particularly by Haygarth, Froiler and Haig Brown. The relation of scarlet fever and streptococcal tonsillitis to

REVIEW OF LITERATURE

2.1 HISTORY

Thermoplastic acrylic chemistry (polymer) was developed initially because of its unique optical properties. It was mainly commercialized at the turning point between the first and second decade of the 20th century. Thermoset acrylic resins as coatings were introduced in Europe, also because of the production of the thermosetting acrylic polymer. But the commercialization of the thermoplastic acrylic resins first occurred in 1931 in Germany, leading to the formation of the Rohm and Haas company. Thermoset acrylic chemistry first arrived in the USA in 1937.

Thermoset acrylic polymer resins are formed through polymerization of the various methacrylic or acrylic monomers. Thermoset acrylic polymer resins are formed by the addition of a cross-linking agent, usually a melamine resin. Thermoset acrylic polymer resins are generally considered more durable than thermoplastic acrylic polymer resins. Acrylic resins were introduced in India in the mid-1960s by Asian Paints (India) Ltd.

The acrylic polymer resins used in this work were supplied by Asian Paints (India) Ltd. The acrylic resins were supplied in the form of a solution in xylene and butyl alcohol. The solution contained 50% of the polymer.

acute rheumatic fever was described by Schlesinger, Collis and Coburn in 1930 and 1931[73], the description of the Anti-streptolysin - O - test by Todd 1932, has permitted correlation of serologic with clinical, epidemiologic and bacteriologic findings.

Treatment of acute streptococcal infection with pencillin was first shown to reduce recurrent attacks of rheumatic fever by Massel and colleagues in 1951 and to prevent the initial attacks by Rammelkamp and coworkers in 1952.

Dillon HL Jr. has proved a disturbing trend of increasing numbers of clinical relapses or recurrent infections has with penicillin, according to him, alternative antibiotics such as oral cephalosporins may now be superior to oral penicillin in terms of lessening the risk of relapse.

3.2 Rheumatic fever:

Rheumatic fever is a multisystem disease the acute manifestations of which may include arthritis and fever, carditis, emotional liability and choreiroform movements and less frequently, a characteristic rash (erythema marginatum) and subcutaneous nodules. Rheumatic fever may properly be considered as a complication of streptococcal infection of the upper respiratory tract which includes pharyngites, tonsillitis, otitis media and scarlet fever.

The incidence of streptococcal infection obviously varies a great deal, depending on geography, age group, economic status. The incidence of rheumatic fever after known streptococcal infection has been estimated to be about 3% in epidemic situations and 0.3% in non-epidemic situations.

3.3 Prevalence:

Population surveys indicate prevalence rate of rheumatic heart disease varying from 0.15% - 0.31% in different parts of the country (WHO 1980) except in cold hilly areas where it is higher (3.96%) as found by Agarwal (1975)[31].

Overall prevalence of rheumatic Heart disease was 0.135% in school children in a rural community of a hill region of Nepal and no case of acute rheumatic fever was identified[71].

In a study conducted by Kassam AS and Zaher SR in Ethiopia out of 816 children with history of streptococcal infection 24 developed acute rheumatic fever, 44 had chronic rheumatic heart disease[78].

A WHO programme for screening of school children (1986-90) gave a prevalence of 0.22% recently identified or already known cases[85].

In a study conducted in rural Australian aboriginal community by Brenann RE and Patel MS the point prevalence for

rheumatic heart disease is 1987 was 0.79% in rural Australia and 1.23% according to official population census. These rates are similar to those reported for third world countries[85].

Eissenberg M.S. has noted that some parts of the developing world have recorded prevalence rates of 1.86%[23].

Out of total 1,433,710 school children who were screened 3135 cases of rheumatic fever were found giving a prevalence of 0.22% which were higher in the African and Eastern Mediterranean region. The countries with the highest prevalance rated were Zambia 12.6%, Sudan 10.2%, Bolivia 17.9% and Egypt 5.19%[85].

3.4 Age:

Age is a definite factor in the development of rheumatic fever, rheumatic fever like streptococeal infection occurs most commonly in children between 5 - 15 yrs of age with a peak incidence of first attack at 6 - 8 years of age. Of 1926 attacks of rheumatic fever in children, Rosenthal et al in 1968 found only 10 patients less than 3 yrs old, in 3 of these the onset of the disease had occured before the age of 2 years[33]. Deneholz and Rambar (1941) reported a case in a 10 day old infant[18].

The rarity of rheumatic fever in infants under 3 years of age and in older adults is probably attributable to the rarity of streptococcal infections at these extremes. Adults who have

intimate and frequent exposure to streptococcal infection as in military service or through close contact with school age children increases with increased risk of rheumatic fever. All India Collaborative study from 1972 to 1975 of children 5-16 years of age showed an extremely high prevalence of 0.56%[45].

According to Padmavati, the 10-14 year age group is more affected than 6-9 years age group as shown in school surveys and prophylaxis programmes[56].

In a study conducted by D.G. Benekappe et al 5.7% rheumatic heart disease patients were in the age group of 7-12 yrs[7] similar observations were made by Vaishnava[79] and Ghosh and Mangat[32] and Mundo RD et al[46].

In Grover's study in rural Northern India the prevalence was 0.08% while in 5 - 15 year olds it was 0.21%[30].

A study in S. Paulo gave a figure of 0.18% in school age population and in adult population in Rio the prevalence rate was 0.77%[2].

Prevalence of rheumatic heart disease among school children in India was 0.6% with wide regional variations 1.11% in Delhi as 43 % of the Indian population is under 14 years. There could be some 6 million children with rheumatic heart disease[56].

In Senegal Koate observed that 93% occurred in 5-10 year age group 41.9% in 11-20 year old age group there by noting the high number of juvenile cases. In Europe 0-3 year cases were among 6 - 7 year olds and 17.4% in 6 - 11 year old almost equal to USA which was 17% in 6 - 17 year olds[41].

Rheumatic heart disease in Western Kenya gave a prevalence of 0.17% all occuring in age group 10 - 15 yrs[4].

In a study by Alain Ekne and Edmond Bertrand in Abidjan the average age of sufferers is 21 years while in Quegad region it is 27 years[3].

The prevalence rate in Egypt in 1972 in the age group 6 - 12 yrs was 0.1%. In India in 1978 in school children it varied from 0.6-1.1%, in Japan in 1971 in age group 6 - 15 year was 0.019%[66].

Mortality data reveal an interesting fact that in 1968 the age group (15-24) rheumatic fever with rheumatic heart disease of youth was the leading cause of death in 6 countries[66].

In a study in Tehran the age specific rates showed a higher incidence in the 5-19 year age group reaching about 0.8/1000[64].

Various studies show that although rheumatic fever occurs

early in India (between 3 - 5 years) initially repeated attacks perhaps because of lack of prophylaxis, make the valvular lesions detectable between 12 - 16 years of age when the maximum prevalence occurs[57].

3.5 Sex:

There is no striking sex difference in the overall incidence of rheumatic fever but chorea and mitral disease are more common in females, aortic valular disease is more common in males.

In India: males are more affected than females in Delhi, females more in Kerala where as both sexes equally affected in mid India[56].

Keith et al has expressed almost equal sex distribution[37] Male preponderance was noted by Ghosh and Mangat[32] and Saxena et al[70].

Male : Female ratio in acute rheumatic fever was 1:1.4 in a study carried out among Ethiopian children[78].

In a study in Tehran, males and females were equally affected[64].

In a study in Mongolia there was definite predominance of famales in the age range 10-30 years[19].

3.6 Socio-economic Status:

Socio-economic conditions influence the development of the disease. Poor housing, crowding, poor diet, - poverty, in short, predispose to rheumatic fever - it occurs with greater frequency, crowding due to socio-economic factors or to military exigencies seems to play an important role in the spread of streptococcal infection and in the incidence of acute rheumatic fever. Standard of living seems to be a determining factor in rheumatic heart disease as well as in rheumatic fever[56] (Padmavati 1978).

Although no single environmental factor has been identified, but the waning of incidence is attributed to improvement of socio-economic conditions, alleviation of overcrowding, improved nutrition and development of physical and environmental barriers to the spread of streptococci[39].

The decline in the morbidity of rheumatic heart disease preceeded the development of antimicrobial therapy and has been attributed to rise in the standard of living and accomodation as proved by Agarwal (1981)[1].

In a study by D.G. Benekappe et al 87% of the rheumatic heart disease cases belonged to low and middle income group[7].

Difference in the socio-economic standards of living remains an important explanation for the difference in incidence

of rheumatic fever in Egyptian children compared with American children[38].

Bhave S.Y. Sane S et al noticed that the point prevalence of rheumatic heart disease was estimated to be 0.7% in the lower socio-economic group and 0.05% in the upper[12].

The incidence of rheumatic fever in socially and economically disadvantaged population is likely to approach 100/100,000 in children. The disease is typically associated with poverty and especially with poor housing and overcrowding[86].

3.7 Literacy:

Peculiar predisposition for females to rheumatic heart disease could be because of lesser health consciousness among women fear in the adverse effects on the prospects of marriage and reluctance to be examined by male doctors. In Egypt (Eisse et al (1970) it could be due to poor hospital utilisation by females, a reflection of illiteracy[66].

3.8 Religion:

In a review of 100 cases of rheumatic fever in children by D.G Benekappe et al 84% of cases were Hindus, 15% Muslims and 1% were Christians[7].

3.9 Overcrowding:

Rheumatic fever rates are higher in blacks than in whites primarily due to increased crowding in these groups (Gordis, Leon 1980)[31].

Rheumatic fever and rheumatic heart disease are a public health problem where poverty, overcrowding, inadequate ventilation and unhygienic conditions are commonly seen (Park 13th edition[59], Strasser in 1973 had also reported similar findings[68]).

P.M.Nair and E. Phillip et al reported in their study that only 47% gave a definite history of overcrowding at home[53].

The majority of affected population in New York (1969-1988) were from the low income and crowded communities[29].

3.10 Occupation:

The prevalence rate of rheumatic heart disease in Pan-Yu country among farmers in China was 0.25% in males and 0.29% among females[90].

Benekappe et al reported that 50% of patients were unskilled, 41% semi-skilled and 6% skilled, 3% among semi-professional[7].

3.11 Clinical Manifestations:

Since rheumatic fever is considered to be a specific host reaction to invasion by the group A beta haemolytic streptococci, it can be easily seen, that the clinical picture, depending on the host will be protean indeed.

The symptoms of rheumatic fever usually develop after a latent period of 1 - 5 weeks. Only about 50% of children having rheumatic fever gave a history of a sorethroat 10 - 14 days prior P.M. Nair and E. Phillips et al reported that 10% of children were less than 5 years of age stressing early onset in tropics[38].

3.12.1 Major Manifestations:

Jones in a historic paparin 1944[36] suggested definite diagnostic criteria for rheumatic fever. He divided the clinical syndrome into two groups, major and minor manifestations. The major manifestations were carditis, chorea, subcutaneous nodules and previous attacks of rheumatic fever. The minor manifestations were fever, abdominal pain, precordial pain, rashes, epistaxis, pulmonary changes, anaemia and high sedimentation rate, later an elevated anti-streptolysin O-titre was also added to the list. More recently a Committee of American Heart Association (1956) modified these criteria which were further revised in 1982 (TRS 764)[88].

Major Criteria

3.12.1.1 **Arthritis:**

The Arthritis of acute rheumatic fever characteristically involves the large joints and is a migrating poly arthrites. The joints become swollen painful and hot, but in the younger children there may be only vague aches. The inflammation in each joint usually develops within a few hours and may take upto a week to subside.

Coombs (1924)[14] Mackie (1926)[47] and Findlay (1931)[25] reported an incidence of heart disease between 60 and 75% in the first attack of arthrites. For two or more attacks, this incidence rose to 70 to 80 percent.

3.12.1.2 **Carditis:**

Definite evidence of carditis almost necessitates the diagnosis of rheumatic fever in children. It may be the only major manifestation especially in infant and young children. It usually appears within the first week of illness. Carditis of rheumatic fever embodies endocarditis, myocarditis and pericarditis. When clinical evidence of pericarditis is present, the carditis is usually severe and involves the myocardium and endocarduim as well (pancarditis), apical mid-diastolic murmur, the so called Carey-Coombs murmur (Coombs, 1908) is always significant, is commonly found in acute carditis. Aortic

diastolic murmurs are also noted. Tachycardia disproportionate to fever is highly suggestive of carditis. Cardiomegaly of appreciable degree can usually be demonstrated on physical examination. Congestive Cardiac failure can be regarded as evidence of carditis obvious enlargment by X-ray.

3.12.1.3 **Chorea**

Rheumatic Chorea also known as Sydenhams Chorea, St. Vitus' dance or chorea minor is a neurological manifestation of acute rheumatic fever. It may appear as the only clinical sign. It may also preceed, follow or exist concomitantly with other manifestations. It occurs most often in prepubertal girls. Its most striking feature is involuntary, purposeless movements. These are usually belateral, but sometime limited to one side of the body only (hemichorea). The speech becomes slurred. The handwriting deteriorates and becomes almost illegible. There is difficulty in holding the protruded tongue still.

Coombs (1924)[14], Mackie (1926)[47] and Findlay (1931)[25] reported that 43 to 45 percent of their cases developed heart disease in the first attack of choreo in two or more attacks, the incidence rose to approximately 55 percent.

Mayer and associates 1963, found that the percentage of patients with chorea who developed carditis remained at approximately 25 percent[48].

Chorea has a self-limiting course of 3-8 weeks. Since it may be precipitated by emotional stress, the child is preferably treated initially in the hospital and not allowed to go back to school till it has completely subsided[67].

3.12.1.4 Subcutaneous Nodules

Rheumatic nodules is a major and specific manifestation of rheumatic fever. They occur almost exclusively in the severest type of rheumatic fever with carditis. Taranta and associates (1962) reported one case as an exception to this rule[25]. They are firm, and non-tender and range in size from 0.1 and 1.0 cm in diameter. They are usually found over the extensor surface of both large and small joints, over the scalp and near the superficial bony prominences of the spine and scapulas. The skin overlying the nodules is freely movable and is not inflammed.

Schlesinger (1930) suggested that the number of nodules may be related to prognosis and concluded that, if the nodule count was under 10 there were a great many more recoveries than if the nodule count was over that figure[73].

3.12.1.5 Erythema Marginatum

It is the distinctive skin rash of rheumatic fever. The pink, often slightly raised macules of the early stages fade centrally and coalesce to form a serpigenous pattern. The

lesions are most common over the trunk or extremities but not in the face.

Of the cases of rheumatic fever 53% had carditis 58% arthritis, 19% chorea and 12% subcutaneous nodules and 11% had erythemia marginatum as reported by S.B. Roy in his study[65].

According to Mundo RD et al 100% of cases had carditis, arthritis was a very rare sign. Chorea and subcutaneus nodules were found to be very rare and erythema marginatum was not reported[46]. Ghosh S. and Mangath R. in their study at Manila reported that 60% of cases had carditis, 37% had arthritis, 6% chorea and only 1% had subcutaneous nodules and no cases were reported with erythema marginatum[32].

In a study of rheumatic fever and rheumatic heart disease in Baroda children by Saxena 57% had carditis, 42.3% arthritis, 3.8% subcutaneous nodules and only 0.4% had erythema marginatum[70].

A study of acute rheumatic fever at the U.P., P.G.H. Medical Centre showed carditis in 64.8% arthritis in 54.9%, chorea 4.4%, subculaneous nodules 4.4% and erythema marginatum in 2.2%[72].

In a study in Oahu 74.4% had polyarthritis, 33.6% had carditis and 10.2% had chorea[16].

In a study conducted by Savitri Shrivastava et al at AIIMS it was found that out of 526 cases with rheumatic Heart disease dominant or pure mitral incompetence was found in 64% and mitral stenosis in 34%[67].

In a study of 883 children, the Jones criteria were applicable in 58% of patients 11% had 2 major criteria and 47% had one major and 2 minor criteria[57].

3.13 Consequences of Carditis of Rheumatic Fever with Rheumatic Heart Disease

According to Marcus 30.7% of patients with rheumatic heart disease were found to have pure mitral regurgitation 38.5% had pure mitral stenosis and 30.8% had mixed lesions[43].

According to Veasy's study in the United States Cardites evidenced byauscultation was the major dominant manifestation in 68% of the cases[71].

Among farmers in South China with a prevalence of 0.25% of rheumatic heart disease 24.1% had isolated mitral stenosis, 13.9% had isolated mitral regurgitation, 34% had both mitral stenosis as well as mitral regurgitation, 8.2% had aortic stenosis and/or aortic incompetence abd 14.6% had double valvular lesions and 1.2% had others[90].

Hypertensive Heart Disease

[illegible]

[illegible]

[illegible]

In India reported incidence is 30-50% of frank migratory/ fleeting polyarthrites, erythema marginatum is seen in 10-13% but rarely detected in India due to dark skin[36].

Delayed appearance of rheumatic heart disease was studied by Bland and Jones 195 in 347 of their cases who had no evidence of heart disease with the first attack, 24% had evidence of heart disease after 10 years and 44% after 20 years. In only one third of this group was there any clear evidence of recurring rheumatic fever activity[9].

Wilson and Leon (1957) summarised their observations of the 757 children followed up. In more than one half of the patients there was combined aortic and mitral lesion[89].

3.14 Minor Manifestations:

3.14.1 Fever:

It is almost invariaby present in the early stage, except in patients whose only manifestation is chorea. It usually varies between 100 degrees Farenheit and 103 degrees Farenheit and is of the relapsing type.

3.14.1.1 Arthralgia:

It is defined as pain clearly localised in the joints without objective finding of arthrites. Varying degrees of arthralgia are encountered while it is common especially in the

young adult patient, no one symptom offers greater diagonstic difficulty, whether the joint changes are objective or mere subjective complaints.

3.15 Evidence of Pre-existing Rheumatic Heart Disease:

Laboratory evidence of a preceeding streptococeal infection can be obtained in most patients with acute rheumatic fever but often not in those with chorea. The frequency with which Group - A streptococci can be isolated from the throat at the time rheumatic symptoms appear is related to the number of cultures taken and the care with which they are performed. The anti-streptococcal antibody test. It measures the inhibition of hemolysin of rabbit red blood cells by specific antibody to streptolysin - O, an extra cellular product of Beta-hemolytic streptococci which in its reduced form is actively hemolytic for these cells.

Normal levels of this and other streptococcal antibodies vary with the age of the population the geographic location and the season of the year. Titres below 250 should be considered normal and titres of 250 to 320 should be considered borderline elevated. In infants and older adults, who normally have lower levels of streptococcal antibodies, titres in the range of 200 to 250 may be significant.

PROBLEM 71. BIS-ATTACHED QUADRATIC HOLLY DIPHRAMS.

[illegible] CONSTITUENT

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A demonstrated rise of two tubes or more in serially collected sera tested simultaneously is evidence of recent streptococcal infection regardless of the absolute level of the titres or the age of the patient.

Approximately 20% of the population fail to demonstrate antistreptrolysin - O antibody responses following a streptococcal infection. Hence a low titre does not rule out the diagnosis of acute rheumatic fever.

Bhave SY, Sane S et al reported that out of 522 patients of rheumatic carditis 77% showed a positive ASO titre, i.e. > 200 IU/ml of which 26.94 had > 400 IU/ml[12].

Dr. Padmavati has shown that out of 883 children examined 47% had 1 major, 2 minor criteria a high ASO titre and high ESR. The rheumatic fever criteria study showed that in the absence of a test for rheumatic fever, raised ESR and ASO levels could be used as supportive evidence although non-specific[57].

Benakappe et al reported that 74% cases reported with fever, 68 with joint pains and 12% with sorethroat[7].

According to S.B. Roy in a study done 83% of cases reported with fever 90% had arthralgia and 82% had significant increase in ASO titre[65].

In a study done in Baroda, Saxena reported the presence of arthralgia in 13.6% cases and 75% of cases had previous history of rheumatic fever/rheumatic heart disease[70].

According to Ghosh and Mangath R 13.6% of cases reported with arthralgia[32]. Sorethroat was present in 67%, Arthralgia almost in 22% of which 45.5% developed carditis according to P.M. Nair, E Phillips et al[53].

3.16 Prevention and Control:

Treatment of streptococcal sorethroat: sulfadiazine and tetracycline should not be used for treating this condition. The ideal treatment is one injection of benzathine penicillin (1.2 million units in adults and 6,00,000 units in children). Oral penicillin, both penicillin G and penicillin V are more expensive and may not be taken regularly because of poor compliance[39].

A polyvalent vaccine containing the prevalent rheumatogenic strains in a given population might be valuable in protecting these at risk of developing rheumatic fever[86]. Harty et al recently have reported production of a set of monoclonal antibodies against a purified fragment of type 24 streptococcus (a rheumatogenic strain) M protein using hyperdine technology. It will be of use, in patients who are sensitive to penicillin or against rare strains of penicillin resistant streptococci which are rheumatogenic[33].

WHO technical report series (1966) recommends that 3 weekly injections of Benzathine penicillin should be used for rheumatic fever prophylaxis in developing countries[83].

Taranta and Markowitz have dismissed the possibility of deterioration due to hot climate and variation in bio availability of penicillin in different batches. They also suggest that a 3 weekly regimen may be more effective and appropriate in developing countries[76].

Test kits for rapid detection of Group A streptococcal antigens in throat swabs by direct methods are commercially available. A result is usually obtainable in under 15 minutes. These kits could make an important contribution to the primary prevention of rheumatic fever[20].

Recent advances in molecular biology have provided information about Group A streptococcus which may prove useful in the development of a reliable and safe vaccine in the future[86].

WHO is tackling this problem by promoting control programme to detect and follow up known cases of rheumatic fever and rheumatic heart disese to study the incidence and prevalence of the disease and its natural history and to improve prophylaxis at community level[66].

Benzathine penicillin was administered to 95.7% of the patients, a reaction was reported by 36 patients 10.3% 100 patient/year and 8/10,000 injection administered during the programme including 11 cases of severe anaphylaxis 0.09% patient/ year or 2/10,000 injections of whom 4 died (0.03%) patient/year or 0.8/10,000 injections[85].

The level of secondary prophylaxis coverge is difficult to assess over long periods because of the influence of many constraints such as shortage of Benzathine benzyl penicillin, inadequate staff weak reporting of activities and low patient compliance. The results of 9 countries with a higher than expected 70% average prophylaxis coverage and with low rates of rheumatic fever recurrence, resemble those from other studies in community control of rheumatic fever/rheumatic heart disease[85].

In a follow-up of aa group of patients being given rigidly controlled intramuscular penicillin prophylaxis, Tompheins and her co-workers (1970) found that about two-thirds of these, who had murmurs of mitral incompetence were murmur-free within 5 - 10 years. Mitral stenosis did not develop in any patient known to have received intramuscular penicillin prophylaxis without fail[87].

MAP OF RURAL HEALTH AND TRAINING CENTRE MANDUR

MATERIALS & METHODS

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This study was carried out in the area covered by the Rural Health cum Training Centre, a 20-bedded hospital and its subcentres, viz. Mandur, Curca, Goa Velha, Agacaim and Carambolim, covering an area of 78.2 sq.kms. and a population of 40,000, from March 1994 to August 1994. This health centre is under the Department of Preventive and Social Medicine of Goa Medical College. It is situated at a distance of about 18 kms. from the city of Panaji, the capital of Goa, and 14 kms. from the Department of Preventive and Social Medicine, Goa Medical College, Bambolim. The centre was established in the year 1968.

Special features of the study area:

The climate of the study area is like that of any other place in the State of Goa, being hot and humid throughout the year. The lowest temperature known is 15.7 degrees Celcius in the winter season and a maximum of 38.7 degrees Celcius is observed in summer. The average annual rainfall ranges from 260-300 cm. The relative humidity is between 79-95%.

Study population:

For the purpose of present study, 10% population was selected by systematic random sampling. So the study population comprised of 4000 people. The family folders of the population were arranged in order of house numbers and chronological order

in each family folder. Every tenth person was selected and included in the study till the required population was obtained. A house-to-house visit to all the selected houses was made with the help of a multipurpose health worker attached to the Rural Health cum Training Centre, to collect information and to examine all the individuals in the study group.

The details of the interview and of the clinical examination were filled in a predesigned and pre-tested proforma as shown in Appendix. If the house was found to be locked or a responsible member was not available to give the necessary information, another visit was made after 7 days. Even after this, if an individual selected was not available for the interview and examination another was selected by the same sampling technique.

Tools of data collection:

The detailed data was obtained by framing and pre-testing 3 schedules of the proforma by the pilot study consisting of 100 individuals. Having done the same, certain modifications were subsequently introduced and the final schedules were re-framed for this study.

The 3 schedules are listed below:

1. The Family Schedule
2. Individual Schedule
3. Laboratory and other relevant investigations

Family schedule:

The individuals included in this study were interviewed either in English or Konkani. This schedule was designed to get information regarding type of family, religion, means of livelihood, economic status, housing and sanitation and positive family history of any illness in the family. The modified B.G. Prasad's classification 1987 was used to classify the population according to income.

Pareek's classification could not be applied here as many of the people did not own land or farm and a lot of people were in service.

Individual schedule:

To elicit data pertaining to rheumatic fever/rheumatic heart disease.

This involved 3 sub-divisions:

1. Symptomatology
2. General examination
3. Systemic examination

A diagnosis of rheumatic fever/rheumatic heart disease was made according to Jones' revised modified criteria mentioned below.

Measurement of weight:

A portable weighing machine was used for recording the weight of the individual. It's accuracy was periodically checked with standard weights. The weight was taken with minimum clothes on. Readings were recorded to the nearest half kg.

Measurement of height:

Persons were made to stand barefoot on a flat floor against a wall, with feet parallel and with head, buttocks, shoulders, back of head touching the wall. The head was held comfortably erect and a mark was made on the wall with the help of a scale touching the top of the head horizontally, height was measured using a steel measuring tape to the nearest 0.1 cm.

Blood pressure:

Mercury sphygmomanometer standardised by comparing with a few other instruments was used. Korotkoff method was used and readings were recorded to the nearest 2 mm. mercury. The blood pressure was recorded after giving rest for 10 minutes to the individual in a recumbent position. The systolic blood pressure was taken as appearance of the first Korotkoff sound when the cuff is deflated slowly whereas diastolic blood pressure was taken at disappearance of the sound.

Recording of pulse:

The pulse was palpated by the middle finger over the

radial artery, with the index and ring finger supporting it and recorded for a whole minute. The normal pulse appears regularly with a rate between 60-100 beats per minute, a good volume and non-thickened arterial wall. The significance of recording the pulse in relation to this study is the feeble, thready pulse felt in rheumatic heart disease. (P.J. Mehta 5th edition)

Temperature:

Oral temperature was recorded using a mercury thermometer. Throat was examined with the help of torch light for any congestion and a swab was taken of the positive cases. The systems were then examined in detail and clinical diagnosis was made. The respiratory, CVS, GIT and CNS systems were examined by inspection, palpation, percussion and auscultation.

To support the clinical diagnosis where necessary, the patient was subjected to some of the investigations mentioned below:

Hb:

Estimation of haemoglobin by Sahli's acid haemometer method as described by Winthrobe.

ECG:

A portable ECG machine with 12 leads (I, II, III, VR, aVR, aVL, aVF, V_1 --- V_6) ECG was used in this study. The patients were called to the health centre as per their convenience and

were made to lie on a wooden bed. The connections were made after applying adhesive jelly at the applying points of various electrodes on the body and ECG was recorded. The interpretation of ECG was done under the supervision of a cardiologist for any abnormal findings and the cases were accordingly referred for further treatment.

ASO Titre:

The standard serological procedure done in a case of suspected rheumatic fever. Values greater than 250 Todd units were taken as significant.

Diagnostic criteria:

Clinically chronic rheumatic heart disease, commonly referred to pathologically as healed rheumatic heart disease represents the continuous effect of many recurrent attacks of active rheumatic carditis manifesting a valvular lesion causing significant alteration in cardiac dynamics (Hurst 1974). The various auscultatory findings as suggested by the American Heart Disease described here have been the indices of diagnosis in this study.

Mitral stenosis:

Diagnostic features I: Due to Mitral stenosis:

1) tapping apex beat 2) a mid diastolic presystolic thrill in the mitral area 3) loud first heart sound 4) mid-

[illegible]

DIAGNOSTIC APPROACH TO DATA FOR WEEKLY VERSUS MONTHLY SYMPTOMS

[illegible]

[illegible]

Diagnostic Criteria

[illegible]

SOD Lines

[illegible]

[illegible]

diastolic murmur with presystolic accentuation best heard in the mitral area with the bell of the stethoscope when the patient is in the left lateral position and holds the breath in expiration accelerated by exercise and a localised murmur. Opening snap present in a few cases.

Mitral incompetence:

Diagnosis: A low collapsing pulse (small waterhammer pulse) heaving apex, systolic thrill in the mitral area, muffled first heart sound and a split second heart sound, a parsystolic best heard in the mitral area with the diaphragm and conducted to the axilla and back which is increased but not on expiration.

Aortic stenosis:

A pulse of small amplitude which rises slowly and falls slowly, a low systolic B.P. with narrowed pulse pressure, apex beat sustained and heaving in character, an ejection systolic murmur best heard in the aortic area and at the apex and conducted to the carotids, second heart sound is soft or absent.

Aortic incompetence:

A hyperdynamic apex beat, a diastolic thrill in the aortic area and third and fourth left intercostal space in the parasternal region, a split second H.S. with a loud A_2, early diastolic murmur in the aortic area over the mid sternum and to the left, transmitted to the apex, best heard with the diaphragm

and the patient leaning forward and holding his breath in expiration. The other clinical signs associated with it are ejection systolic murmur in the aortic area, visible arterial pulsation, Corrigan's sign (dancing carotids), pistol shot sounds over femoral artery (Traube's sign).

Social aspects were also studied as described in tables that follow. Secondary prophylaxis was administered to all the patients diagnosed which consisted of 12 lac units of Benzyl penicillin given every 21 days. In those who were found to be allergic to penicillin low dose Cotrimoxazole was given daily, or low dose erythromycin. Suitable preventive/control measures were suggested to the population eg. educating the patients regarding the importance of recognizing and treating streptococcal sore throats in order to prevent rheumatic heart disease, advice regarding monthly injection of penicillins.

Modified Revised Jones Criteria (1982)

Major Criteria	Minor Criteria
1. Carditis	A) Clinical
2. Polyarthritis	i. Fever
3. Subcutaneous nodules	ii. Arthralgia
4. Chorea	iii. Previous rheumatic fever/rheumatic heart disease
5. Erythema Marginatum	

Essential criteria

evidence of recent streptococcal infection as indicated by

1) increased ASO Titre or other anti-streptococcal antibody titre

2) positive throat culture

3) recent scarlet fever

B) Lab

i. acute phase reactants leucocytosis, CRP increased ESR

iii) prolonged PR interval on the ECG.

Working definitions:

Rheumatic fever:

It is an acute inflammatory syndrome which follows streptococcal pharyngitis and characterised by at least one major and two minor criteria or two major criteria.

Rheumatic heart disease:

It is the result of damage produced by recurrent attacks of rheumatic carditis and subsequent healing process, the changes of which are largely confined to the valve structure. (MS, MI, AS, AI) with or without failure (TRS 764).

Primary prophylaxis:

It is the treatment of upper respiratory tract infection due to Group A streptococci to prevent an initial attack of acute rheumatic fever. This includes a single IM injection of

[illegible]

[illegible]

[illegible]

[illegible]

benzathine benzyl penicillin (12 lac) for adults and 6 lacs for children or by 10 days treatment with oral penicillin, for patients sensitive to penicillin erythromycin can be given. (TRS 764).

Secondary prophylaxis:

It is the regular administration of an antibiotic (usually penicillin) to a patient who has had rheumatic fever in order to prevent colonisation and/or infection of the upper respiratory tract with Group A streptococci and the subsequent development of recurrent attacks of rheumatic fever. This consists of 12 lac units of benzyl penicillin given every 3 weeks in adults and 6 lac units in children. (TRS 764).

Limitations of the study:

1. This study was conducted in a rural population in Goa. It will not be applicable to the general Indian rural population. Hence it should be viewed accordingly.

2. Due to time constraints, the population included in this study had to be limited, although best possible efforts were made to make it representative for the problems studied.

OBSERVATIONS

&

DISCUSSIONS

OBSERVATIONS AND DISCUSSIONS

TABLE I

Distribution of rheumatic heart disease in relation to Age

Age Group Years	Study Population	Rheumatic heart disease cases in age specific groups	Percentage of rheumatic heart disease cases
0 - 4	448	-	0
5 - 9	500	5	1%
10 - 14	601	10	1.66%
15 - 19	488	6	1.22%
20 - 24	160	6	3.75%
25 - 29	435	7	1.6%
30 - 34	398	-	0
35 - 39	390	6	1.53%
40 - 44	317	5	1.57%
45 - 49	263	-	0
	4000	45	

The prevalence of rheumatic heart disease in the study population is 1.12%. However, age-wise prevalence showed a high percentage of 3.75% in the 20-24 year age group followed by the 10-14 year age group with a percentage of 1.66%.

Population surveys in India indicate prevalence rate of rheumatic heart disease of 0.15% - 0.31% in different parts of the country. However, it was 1.1% in Delhi and in some parts of the developing world. According to Eissenberg it was 1.86%, similar to that found in the present study.

According to a school survey[50], the 10-14 year age group is more affected than the 6-9 year, which corresponds to the present study. However, the causes of the relatively higher prevalence will be unravelled in the following tables.

TABLE II

Rheumatic Heart Disease and age at onset

Age Groups	Age at first attack
0 - 4	-
5 - 9	17
10 - 14	25
15 - 19	3
20 and above	-

55.56% of the patients were first affected between 10-14 years of age in comparison to 37.8% of cases in 5-9 years age group. No evidence of first attack was seen at 20 years and over. In Senegal Koate observed that 93% occured in 5-10 years age group, 41.9% in 11-20 years age group[50].

TABLE II

Rheumatic Heart Disease and age at onset

TABLE III

Distribution of rheumatic heart disease sex-wise

	Study Population	Population with rheumatic heart disease	Population without rheumatic heart disease	Percentage
Males	1935	19	1916	0.98%
Females	2065	26	2039	1.25%
Total	4000	45	3955	

$\chi^2 = 0.689$ d.f. = 1 $P > 0.05$

In the present study the prevalence of rheumatic heart disease was found to be more in females (1.25%) as compared to males (0.98%) in the respective populations, giving a male to female ratio of 1:1.3. Many workers have found a male predominance with respect to the cases of rheumatic heart disease, both in adults and children. The prevalence of rheumatic heart disease was not found to be statistically significant in relation to sex. Padmavati, in his study in Kerala, also found a female preponderance probably the reasons being lesser health consciousness among females, fear of adverse effects on the prospects of marriage, reluctance to get examined by a male doctor or due to poor utilisation of hospital services.

TABLE III

Distribution of rheumatic heart disease sex-wise

TABLE IV

Rheumatic heart disease morbidity by religion

Religion	Study Population	Population with rheumatic heart disease	Population without rheumatic heart disease
Christian	1874	12 (0.64%)	1862
Hindu	2109	30 (1.42%)	2079
Others	17	13	14
Total	4000	45	3955

χ^2 = 0.1833 d.f. = 1 P > 0.05

(fig. in parenthesis indicate percentage)

Higher prevalence of rheumatic heart disease was found among Hindus, i.e. 1.23% and among the Christians it was 0.58% who were affected, not significant at 95% confidence limits. The higher prevalence is probably due to non-acceptance of the help of medical services, joint families with tendency to overcrowding.

In a study by Benakappe similar findings were noted. Of the 100 cases, 84% were Hindus and 1% were Christians.

TABLE V

Rheumatic heart disease versus literacy of parents

	Study Population	Rheumatic heart disease cases	Percentage of rheumatic heart disease cases
Literate : Primary school	756	11	1.46%
Middle school	820	8	0.98%
High school	907	7	0.77%
Higher Secondary School (Graduate & above)	490	1	0.20%
Illiterate	937	18	1.92%
Total	4000	45	

$X^2 = 6.97$ d.f. = 1 $P < 0.01$

The prevalence of rheumatic heart disease among the children of illiterate parents was found to be higher (1.92%) as compared to the prevalence among the children whose parent/s were literate (0.88%). The prevalence of rheumatic heart disease decreases with increasing level of education which explains the importance of parental knowledge in the prevention of the disease for medical services for early detection. There was a statistical significance between literacy and rheumatic heart disease prevalence.

Similar findings were noted by Eisse and Ibrahim in their studies.

TABLE VI

Distribution of rheumatic heart disease among social classes
(Revised B.G. Prasad's classification, 1987)

Socio-economic status / Per capita income per month	Study Population	Number of cases with rheumatic heart disease	Number of cases without rheumatic heart disease
I (> Rs. 1215)	33	-	33
II (Rs. 608 - 1214)	1040	9 (0.87%)	1031
III (Rs. 284 - 607)	1736	17 (0.98%)	1719
IV (Rs. 121 - 283)	998	11 (1.10%)	987
V (< Rs. 121)	193	8 (4.14%)	185

X^2 = 17 - 14 df = 3 $p < 0.001$

Higher prevalence was noted in the population belonging to the economically backward community and the prevalence was the highest in Social Class V (4.14), none in Social Class I. (This was statistically highly significant.) Prevalence showed an increase with decreasing level of socio-economic status.

The above tables indicate the need to direct the strategies of prevention and control of rheumatic heart disease to the lower social classes and those having a lower level of literacy. Bhave S.Y., Sane Y. et al also found that the point prevalence of rheumatic heart disease was higher 0.7% in the lower socio-economic group and 0.05% in the upper socio-economic group.

TABLE VII

Rheumatic heart disease versus occupation

(ICMR classification 1981)

Occupation	Study Population	Number of cases	Percentage
Student	406	25	6.15%
Unemployed	175	2	1.14%
Housewife	991	-	-
Unskilled	339	7	0.70%
Semi-skilled	916	2	0.22%
Skilled	556	1	0.17%
Clerical	223	3	0.44%
Farmer	327	4	1.20%
Shop Owner	9	-	-
Semi-professional	37	1	2.70%
Professional	10	-	-
Retired	11	-	-
Total	4000	45	

The student community showed a higher prevalence than other occupations i.e. 6.15% (directly related to age factor) of which 4.15% students belonged to Class IV and V which indicate the combined role of social class, exposure to streptococcal infection higher in school children because of close contact.

This was statistically highly significant in comparison with Benakappe et al wherein 50%, 41%, 6%, 3% were among unskilled, semi-skilled, skilled and semi-professional whereas in the present study, the prevalence rate was 15.56%, 4,45%, 2.22%, 2.22% among the above groups respectively. However, the student population comprised of 55.56% of the cases which indicates the need for intensive health education at school level.

TABLE VIII

Rheumatic heart disease with overcrowding

Overcrowding	Study Population	Population with rheumatic heart disease	Population without rheumatic heart disease
Yes	2876	40 (1.39%)	2842
No	1124	5 (0.4%)	1113
Total	4000	45	3955

$Z = 3.54$ $p < 0.001$

(fig. in parenthesis indicates percentage)

In the present study, rheumatic heart disease prevalence was found to be higher among population showing increased crowding in their families.

The prevalence found being 0.99% higher in population living in overcrowded environment. This difference was found to be statistically highly significant. Gordes-Leon also reported similar findings in their study. Overcrowding increases the exposure to streptococcal infection.

TABLES IX

Rheumatic heart disease and housing conditions

Type of Housing	Study Population	Population with rheumatic heart disease	Percentage of rheumatic heart disease cases
Kutcha	1907	31	1.63%
Semi-pucca	1034	9	0.89%
Pucca	1059	5	0.48%
Total	4000	45	

$X^2 = 244.4$; df = 2 ; $p < 0.001$

Rheumatic heart disease with ventilation

Ventilation	Study Population	Number of cases with rheumatic heart disease	Cases without rheumatic heart disease
Inadequate	2940	39 (1.32%)	2901
Adequate	1060	6 (0.56%)	1054
Total	4000	45	3955

Z = 1.995 ; $p < 0.05$

Among the total cases, 68.8% live in kutcha houses whereas only 11.1% live in pucca houses (statistically significant). This is mainly due to poor environmental conditions, increased humidity in kutcha houses. Ventilation played an important role in the prevalence of the disease. In this study 39 out of 45 cases were living in houses with inadequate ventilation. This is in accordance with the study done by Strasser et al.

TABLE X

Association of carditis with other major manifestations

Manifestations at first episode	Number of cases	Percentage of rheumatic heart disease cases
Carditis alone	29	64.4%
Carditis + arthritis	9	20.0%
Carditis + chorea	4	8.8%
Carditis + erythema margination	-	0
Carditis + subcutaneous nodules	3	6.67%
Total	45	

In the present study carditis was the prime major manifestation seen in all cases presently prevalent. 20% of the

TABLE X

Association of certain with other major manifestations

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[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

cases had associated arthritis which emphasizes the importance of the second major manifestation. All the others accounted for less than 16%.

In a study of rheumatic fever and rheumatic heart disease in Baroda children by Saxena 57% had carditis, 42.3% arthritis, 3.8% subcutaneous nodules and only 0.4% had E.M. Hence in rural areas the major manifestation to be stressed on for the diagnosis of rheumatic heart disease are arthritis and carditis.

TABLE XI

Minor manifestations in the diagnosis of rheumatic fever

Manifestations at first episode	Number of cases	Percentage
Fever	44	97.78%
Fever + joint pain	23	51.11%
Fever + sore throat	36	80.00%
Sorethroat	37	82.20%
Joint pain	34	75.50%
Fever + joint pain + sorethroat	19	42.20%
Sorethroat + joint pain	11	24.44%

It was seen that 97.78% of the patients presented with fever while 51.11% and 80.00% had fever associated with joint

TABLE XI

Mean differences in the diagnosis of impedance level

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

pain and sore throat respectively 82.2%; and 75.5% sorethroat and joint pain as the only minor manifestations. 42.2% had fever, sorethroat as well as joint pains whereas 24.44% had only joint pains and sorethroat. Benakappe et al reported that 74% cases reported with fever, 68% with joint pains and 12% with sorethroat.

TABLE XII (a)

Residual Heart disease - sequelae of rheumatic fever

Residual Heart disease	Number of rheumatic heart disease cases	Percentage of rheumatic heart disease cases
MI	11	24.4%
MS	16	35.5%
MS + MI	7	15.5%
AI	2	4.4%
MS + AI	5	11.1%
MS + MI + AI	3	6.6%
MS + MI + AS + AI	1	2.2%
Total	45	

Mitral stenosis only was found to be the commonest heart lesion detected among those who developed residual heart disease (35.5%) which was maximum. All four valvular lesions viz. Al, AS and Ml, MS were seen in only 2.2% of the patients.

Solitary lesion was seen in 64.3% of cases, 2 lesions were seen in 12.6% cases, 3 lesions were seen in 6.2% of cases.

Among farmers in South China 24.1% had isolated mitral stenosis, 13.9% had only mitral incompetence, 34% had both mitral stenosis and/or aortic incompetence and 14.6% had double valvular lesions and 1.2% had others[90].

TABLE XII (b)

Relation of rheumatic heart disease and secondary prophylaxis

Residual Heart disease	Number of cases	Number of cases of regular secondary prophylaxis
MI	11	9 (81.80%)
MS	16	13 (81.25%)
MS + MI	7	4 (57.14%)
AI	2	1 (50.00%)
MS + MI	5	3 (60.00%)
MS + MI + AI	3	1 (33.30%)
MS + MI + AS + AI	1	-
Total	45	

The patients with 4 lesions had never received secondary prophylaxis. Among those with solitary lesions 79.3% were on

regular secondary prophylaxis and of those with 2 lesions 58.3% were on regular chemoprophylaxis.

The above data stresses the importance of secondary chemoprophylaxis to prevent progression of valvular lesions.

In a study done by Tompheins, mitral stenosis did not develop in any patient known to have received intramuscular penicillin prophylaxis without fail[77].

SUMMARY

SUMMARY

The present study was carried out in a rural area catered by the Rural Health cum Training Centre, Mandur, a 20-bedded hospital, and its subcentres covering an area of 78.2 sq.km and a population of 40,000, from March 1994 to August 1994 to study the prevalence of rheumatic fever and rheumatic heart disease and the social factors associated with rheumatic heart disease and to administer secondary penicillin prophylaxis in the area. Finally to recommend preventive and control measures so that rheumatic fever/rheumatic heart disease ceases to be a public health problem in the near future.

The sample population of 4000 was selected consisting of 10 percent of the toal population. It was a cross sectional study.

The following is the summary of the results obtained.

6.1 The overall prevalence of rheumatic heart disease in this rural study population was found to be 1.2%. The highest prevalence of 3.75% was seen in the 20-24 year age group followed by the 10-14 age group with a percentage of 1.66%.

6.2 Higher prevalence was found in females (1.25%) as compared to males (0.98%) giving a male to female ratio of 1:1.3 in the respective population.

6.3 The impact of religion as a variable in the distribution of rheumatic heart disease was seen. Higher prevalence was found among Hindus (1.23%) and in Christians it was 0.58%. There was no significant asociation of the presence of rheumatic heart disease with religion.

6.4 Literacy played a major role in the prevalence of rheumatic heart disease. Among the children of illiterate parents the prevalence was 1.92% whereas among the children whose parent/s were literate it was 0.88%. There was a strong association between the prevalence of rheumatic heart disease and parental literacy.

6.5 Rheumatic heart disease was found to be most prevalent among population showing increasing crowding in their families. The prevalance was 1.39% in those showing crowding while it was 0.4% in those not showing overcrowding.

6.6 Impact of variables like housing, when considered showed a high prevalence 68.8% among kutcha house dwellers as compared to pucca house dwellers.

6.7 Inadequate ventilation was found to be an important factor in the increased prevalence of rheumatic heart disease. Prevalence was higher in those with inadequate ventilation (1.32%) compared to these with adequate ventilation which was 0.56%.

6.8 Majority of the patients presented with carditis alone followed by these having carditis along with arthritis 20% carditis and chorea (8.8%) and carditis and subcutaneous nodules (6.67%). No patient was delected having carditis and erythema marginatum.

6.9 High prevalence was noted in the population belonging to the economically backward community. The prevalence went on increasing from social class I - V. The prevalence being 0 in class I, 0.87% in II, 0.98% in III, 1.10% in IV and 4.14% in V.

6.10 The prevalence of rheumatic heart disease was most common among the student population (6.15%) while it was nil among the professionals, the retired and housewives. Among the unemployed it was 1.14%, unskilled 0.7% and skilled 0.44%.

6.11 Among the minor manifestations, 97.18% of the patients were presented with fever, whereas fever with associated joint pain was seen in 51.11% of cases, fever with sorethroat in 80%. 80% were presented with only sorethroat, 82.2% with jointpain and 75.5% presented with fever, sorethroat and jointpains and 42.2% with sorethroat and jointpains. Past rheumatic fever could be obtained from all the cases.

6.12 Mitral stenosis was found to be the commonest heart lesion (35.59) detected among those who developed residual heart

disease, complication of mitral stenosis along with mitral incompetence, aortic stenosis and aortic incompetence was noted in only 2.2% of the patients.

It was seen that patients with 4 lesions had never received secondary prophylaxis. 79.3% of the cases with solitary lesion were on regular secondary prophylaxis while only 58.3% of those with 2 lesions and 33.3% of those with 3 heart lesions were in regular secondary prophylaxis.

6.13 Most of the cases which were first diagnosed were in the age range of 10-14 years (55.5%) followed by those in the age group 5-9 years (37.7%). Only 66% of the cases were first diagnosed in the 15-19 year age group.

Hence in the initiation of prevention and control measures, emphasis is to be laid in public health education in the early detection and treatment of sorethroat to prevent the occurence of rheumatic fever & thereby rheumatic heart disease.

RECOMMENDATIONS

RECOMMENDATIONS

7.1 Rheumatic fever/rheumatic heart disease continues to be a public health problem in the developing world causing mortality and morbidity both among children and adults. Although little longitudinal data is available, evidence suggests that there has been little, if any, decline in the occurrence of rheumatic heart disease over the past few decades.

Though guidelines for the control of rheumatic fever/ rheumatic heart disease have been laid down by WHO and other bodies, its control has been largely neglected because of the haelth priorities in many countries. The high cost and poor facilties for cardiac surgery provides strong justification for prevention.

The major intervention for prevention and control include reduction of exposure to Group A streptococci. Streptococcal research will help not only in improving the quality of primary prevention of rheumatic fever but also in developing streptococcal vaccines.

7.2 Since the prevalence of rheumatic heart disease in the present study is 1.12%, this population definitely requires some preventive measures to reduce this problem.

7.3 The decrease of rheumatic fever can be achieved by improved socio-economic conditions, elimination of overcrowding, development of physical barriers to the spread of streptococci and improved nutrition.

7.4 The first attack of rheumatic fever can be prevented through very large treatment coverage of streptococcal infection even though only 0.3% - 3% will result in rheumatic fever, primary prophylaxis to prevent initial attack of rheumatic fever. It is seen that the prevalence of rheumatic fever increases the need for early detection and treatment of streptococcal pharyngitis. Sorethroat, in the majority of cases is of viral origin. However 10 - 20% cases are caused by streptococci and 1% - 3% are associated with rheumatic fever. Hence surveillance of school children, treatment of pharyngitis ideally with one injection of Benzathine penicillin (1.2 million units) for adults and 6 lakhs for children is to be carried out as it is least expensive, least allergenic with maximum compliance. All this must be integrated into the primary health care system.

7.5 Surveillance of known cases of rheumatic heart disease and rheumatic fever in a community and regular penicillin prophylaxis in order to prevent relapse and deterioration is important.

The percentage of patients with rheumatic heart disease was higher in those with low literacy levels, lower social

classes, the student community, hence health education should form the mainstay of a Prevention and Control programme.

Here the role of parents, teachers and primary health care workers is emphasized in detecting sorethroat and rheumatic fever cases and the continuation of secondary prophylaxis. Rheumatic fever clinics are essential to increase compliance.

7.6 Health educational activities should be organised for parents - specially the mother, patients, their relatives and the general public. Broadcasting, educational programmes on radio, television, etc., use of pamphlets, brochures and posters, newspaper articles - these activities are to be conducted by doctors, nurses and other trained personnel.

7.7 Primary care physicians have a key position in the prevention and care of rheumatic heart disease because of the close contact with patients and their families. Their knowledge should be updated by workshops or seminars orgainised by teaching institutions.

The principles of rheumatic fever are often taught poorly in many medical schools. One reason is that the entire field of preventive medicine is often under-represented in the curriculum. This situation should be corrected mainly through the teaching of streptococcal microbiology in a clinical context by departments

of pediatrics, cardiology and community medicine, school health services, etc. Nurses should also be motivated to play a significant role.

7.8 Role of auxilliary personnel should be (1) health education in acute rheumatic fever (2) secondary prophylaxis which consists of giving (1.2) million units of Benzathine penicillin for adults and 6 lakh units for children (3) Examination of 5 - 15 year olds with suggestive acute infections (4) search for contacts with symptoms.

7.9 Stress should be laid on the preventive aspects of rheumatic heart disease in the curriculum of preventive medicine in medical schools. It should include knowledge about the socio-cultural factors and preventive aspects and socio-economic consequences of life-long cardiac disability.

7.10 The ultimate aim should be to incorporate screening surveys into the routine school health examination system since the prime target consists of children aged between 5 and 16 years. The facilities used for prevention would mainly be those of the services of primary health care, school medicine and maternal and child health care. For screening, the facilities of hospital departments and the help of trained nurses would be necessary.

There should be a natural assessment of the risk involved, its financial toll and the effects on children.

Evaluation of programmes by periodic surveys, of random samples of school children is the best indicator which has to be followed.

Since student community i.e. age group 5 - 15 years, is most involved, surveillance to identify the epidemiological pattern in the community and to monitor streptococcal infection is important. Two or three surveys (which include clinical, bacteriological and serological examination) covering the principle seasons of the year are desirable. The surveillance should be the responsibility of the national rheumatic fever control programme. The criteria which are well documented for identification of the condition should be brought to the attention of parents, teachers and auxiliary health workers.

7.11 Laboratory facilities for both culture and serology should be available, but because these services are poor in developing countries, the clinical suspicion remains the main platform on which further action should be taken.

7.12 A school health registry should be maintained, the objective of which would be to characterise rheumatic fever and rheumatic heart disease cases, to determine the effectiveness of

the present modalities of prophylaxis and to determine reasons for non-adherence to the prophylactic regimen.

A rheumatic fever registry is to be maintained for effective follow-up of rheumatic fever patients. This registry should:

i) have a record of all rheumatic fever patients receiving continued prophylaxis,

ii) maintain a list of patients due for prophylaxis each month,

iii) should also contain a list of patients who should continue prophylaxis but failed to have their prescription filled.

The poverty-disease poverty circle should be attacked from both directions.

7.13 A national rheumatic fever/rheumatic heart disease control programme should be started.

1) The health authorities must be persuaded about the need for and feasibility of rheumatic fever control. For this, support of voulntary orgainsations, local opinion leaders and health professionals is necessary since rheumatic disease has serious consequences for the national health systems and social services existing. Community planning and social services have to take account of the high incidence of disabilities suffered by the patient. Assistance can be given to the patient in areas of

transport, housing, ergonomics, sheltered workshops, supply of work rehabilitation or retraining.

Mobile physiotherapy units, occupational guidance and self-help devices will prove useful.

The assignment of appropriate priority to the control of rheumatic fever should originate not only from the understanding of epidermology but also taken into account the socio-economic growth of developing countries and be considered within the concept of integration of health care activities in a multipurpose health care delivery system.

Finally, a fully established control programme should operate a central register for patients with rheumatic fever and rheumatic heart disease -

(1) to promote cooperation between participating physicians, school health services, MCH centres, hospitals and laboratories.

(2) to establish and maintain a system of regular secondary prophylaxis.

(3) promote health education and keep health personnel at all levels informed about rheumatic fever and rheumatic heart disease in general and the programme in particular.

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PROFORMA

P R O F O R M A

The Prevalence of Rheumatic Heart Disease in a Rural Population Catered by Rural Health cum Training Centre, Mandur and Administration of the Secondary Prrophylaxis.

Family Schedule:

Name of the patient A/S/

Village : _____ House No. _____

Father's name : _____ Mother's name :_____

Literacy states of Father _____ Literacy states of mother

Religion : _____ Hindu/Muslim/Christian/Others

Type of Family: Joint/Nuclear _____

Source of Income: Father's income : _____

Mother's income : _____

Total income : _____

Social classification : I / II / III / IV / V
(Revised B.G. PRASAD'S classification)

Environmental Sanitation : Hygenic/Unhygenic _____

Locality of house: Kutcha/Semi-kutcha/Pucca _____

No. of living rooms: _____

Overcrowding: Present/Absent _____

Ventilation: Adequate/Inadequate _____

Water supply: Hard pump/Sanitary well/Open shallow well _____

Whether using Boiled/Chlorinated water _____

Excreta disposal Sanitary/Insanitary (Specify) _____

H/o any illness in the family. _____

II Individual Schedule: (Pertaining to RHD)

(a) Did you suffer from any one or more of the following:

Yes/No _____

	Duration	R_x given
1. Dyspnoea/or Orthopnoea	_____	_____
2. Palpitations	_____	_____
3. Cyanosis	_____	_____
4. Cedema of feet	_____	_____
5. Chest pain	_____	_____
6. Recurrent sore throat	_____	_____
7. Recurrent infection (Respiratory)	_____	_____
8. Urinary tract infection	_____	_____
9. Dry cough	_____	_____
10. Any abnormal movements (Chorea)	_____	_____
11. Difficulty in swallowing	_____	_____
12. Hoarseness of voice	_____	_____

(c) Were the above symptoms followed by:

a) Fever : type (specify) _____

b) Pain & swelling & redness of knee/ankle or any other joint:

Yes/No _____

c) Did you ever cough blood: Yes/No _____

d) Were you receiving penicillin injections every month _____

e) Are you aware that sore throat can lead to heart disease

Yes/No _____

Physical Examination:

Ht in cm _____ Wt in kg _____

General Examination:

Pallor : present/absent _____

Throat congestion present/absent _____

Nails: Clubbing/cyanosis present/absent _____

Pulse: Rate/rhythm/volume/arterial wall _____

Temp: _____ Bp: _____

Rash: Present/absent (specify) _____

Swelling of feet: present/absent _____

Neck vein: present/absent _____

Apex beat Normal/abnormal _____

site of apex beat _____

Heart sound Normal/abnormal _____

area _____

Murmur Specify type _____

character _____

RS: abnormal breath sounds _____

(crepts., rhonchi) _____

P/A: Liver: palpable/Non-palpable _____

Spleen: palpable/Non-palpable _____

Clinical diagnosis: _____

III Clinical Investigations:

Hb in gm % _____

ECG findings _____

ASO titre _____

C-Reactive Protein _____

DEEP